



VACUUM OVEN

Model: **VPX9-2**

Installation and Operation Manual

Sheldon Manufacturing, Inc. P.O. Box 627, 300 N 26th Avenue, Cornelius, Oregon 97113

EMAIL: tech@Shellab.com; www.Shellab.com

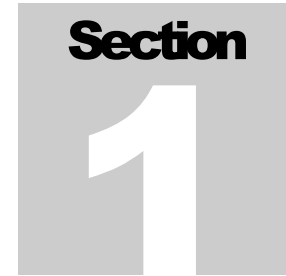
1-800-322-4897 (503) 640-3000 FAX (503) 640-1366

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This is a general-purpose vacuum oven for professional, industrial or educational use where the preparation or testing of materials is done in a working environment that is at approximately atmospheric pressure, and no flammable, volatile or combustible materials are being heated. This oven is not intended for hazardous or household locations or use.



RECEIVING AND INSPECTION

Your satisfaction and safety require a complete understanding of this unit. Read the instructions thoroughly and be sure all operators are given adequate training before attempting to put the unit in service. This equipment must be used only for its intended application; **ANY ALTERATIONS OR MODIFICATIONS WILL VOID YOUR WARRANTY .**

- 1.1 Inspection:** The carrier, when accepting shipment, also accepts responsibility for safe delivery and is liable for loss or damage. On delivery, inspect for visible exterior damage, note and describe on the freight bill any damage found, and enter your claim on the form supplied by the carrier.
- 1.2** Inspect for concealed loss or damage on the unit itself, both interior and exterior. If necessary, the carrier will arrange for official inspection to substantiate your claim.
- 1.3 Return Shipment:** Save the shipping crate until you are sure all is well. If for any reason you must return the unit, first contact your customer representative for authorization. Supply nameplate data, including model number and serial number. Please see the manual cover for information on where to contact Customer service.
- 1.4 Accessories:** Verify that all of the equipment indicated on the packing slip is included with the unit. Carefully check all packaging before discarding. The oven is equipped with three (3) shelves. No vacuum pump is supplied with this unit.

Section 2

INSTALLATION

Local city, county or other ordinances may govern the use of this equipment. If you have any questions about local requirements, please contact the appropriate local agency.

Installation of the 1495 requires hard wiring and is best performed by a qualified electrical technician. A 20 amp circuit breaker may be used provided that all other requirements in article 422 of the National Electric Code (USA) are met. Other areas may require a different installation.

Under normal circumstances this unit is intended for use indoors, at room temperatures between 5° and 40°C, at no greater than 80% Relative Humidity (at 25°C) and with a supply voltage that does not vary by more than 10%. Customer service should be contacted for operating conditions outside of these limits.

2.1 Power Source: The electrical supply circuit to the vacuum oven must conform to all national and local electrical codes. Consult the oven's data plate for the voltage, cycle, and amperage requirements before making connection. VOLTAGE SHOULD NOT VARY MORE THAN 10% FROM THE DATA PLATE RATING. This unit is intended for 50/60 Hz operation. A separate circuit is strongly recommended to prevent possible loss of product due to overloading or failure of other equipment on the same circuit.

2.2 Location: When selecting a site for the oven, consider all conditions that may affect performance, such as extreme heat from radiators, stoves, other ovens, autoclaves, etc. Avoid direct sun, fast-moving air currents, heating/cooling ducts, and high traffic areas. To ensure proper air circulation around the unit, allow a minimum of 5cm between the oven and any walls or partitions that might obstruct free airflow.

Please note that once a location is chosen and the unit has been completely installed, the castors at the base of the cart should be locked into place to provide optimum working and safety conditions.

2.3 Lifting / Handling: This unit is heavy and care should be taken to use appropriate lifting devices sufficiently rated for this load. Please see section 8, Unit Specifications for weight information. Units should only be lifted from their bottom surfaces. Doors, handles and knobs are not adequate for lifting or stabilization. The unit must be completely restrained from tipping during lifting or

transport. All moving parts, such as shelves and trays should be removed and doors need to be positively locked in the closed position during transfer to prevent shifting and damage.

- 2.4 Cleaning:** The oven interior was cleaned at the factory, but not sterilized. Remove shelves and shelf slides, if installed, and clean with a disinfectant that is appropriate for your application. Refer to section 7.1 for complete cleaning instructions.

WARNING: Never clean the unit with alcohol or flammable cleaners with the unit connected to the electrical supply. Always disconnect the unit from the electrical service when cleaning and assure all volatile or flammable cleaners are evaporated and dry before reattaching the unit to the power supply.

- 2.5 Shelf Placement:** Place shelves in the chamber at the desired location.

PRECAUTIONS

NOTE: THIS IS NOT AN EXPLOSION PROOF OVEN.

- 3.1** Do not place or use explosive, combustible, or flammable materials in the oven.
- 3.2** Do not use sealed containers in the oven chamber.
- 3.3** Disconnect the unit from electrical power source before attempting to make any repairs or component replacements.
- 3.4** If a mercury thermometer is used and breakage should occur, all spilled mercury must be completely removed from the chamber.
- 3.5** This oven **IS NOT** suitable for use in Class I, II, or III locations as defined by the National Electrical Code NFPA 70, U.S.A.

GRAPHIC SYMBOLS

Your oven is provided with a display of graphic symbols to help in identifying the use and function of the available adjustable components.

2.1



This symbol indicates that you should consult your manual for further description of a control or user item.

2.2



Indicates “**AC Power**”.

2.3



Indicates “**Temperature**”

2.4



Indicates “**Over Temperature Protection**”

2.5



Indicates “**Vacuum**”

2.6



Indicates “**Earth Ground**”

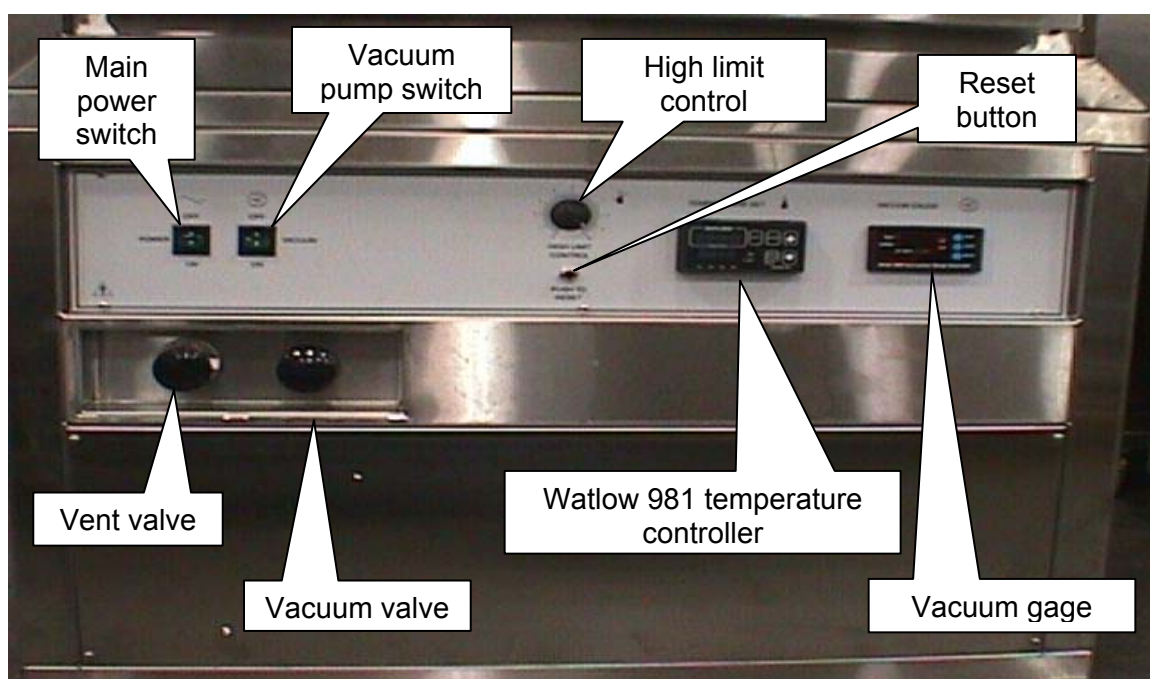
2.7



Indicates “**Potential Shock Hazard**”

CONTROLS OVERVIEW

Figure 1



- 5.1 Main Power Switch:** The Main power I/O (on/off) switch is marked POWER and controls all power to the unit. It must be in the I, or ON position before any systems are operational including the vacuum pump. The green pilot light in the switch will be on when the unit is energized.
- 5.2 Vacuum Switch:** This I/O (on/off) switch is marked VACUUM and it controls power to the vacuum pump. The green pilot light in the switch will be on when the pump is energized. See section 6.1 for further discussion on connecting the vacuum pump.
- 5.3 Main Temperature Control:** This is a microprocessor based temperature/time control with ramp and soak capabilities. The Watlow 981 controller has digital displays and front panel controls for inputting set point temperature, calibration and program configurations. Detailed instructions are in the *Watlow 982 Users Manual* included with your instruction packet.

- 5.4 High Limit Control:** This control is completely independent of the Main Temperature control and provides safety temperature protection for the oven. If for any reason the oven temperature rises above the Main Temperature control's set point, a properly adjusted High Limit control will limit the rise to approximately 10°C above the Main Temperature set point. In addition to this safety feature, there is a power relay that works in conjunction with the High Limit. The power relay is deactivated if the High Limit set point is reached, and incoming power to the heating elements and temperature controller will be cut off.

The High Limit Control is equipped with an adjustment knob that requires a flat-edged tool when making adjustments. This is to reduce the chances of accidental changes.

- 5.5 Reset Button:** This button is located just below the High Limit Control. During initial start-up, power interruptions or after activation of the High Limit Control, this button must be depressed to reset the main power relay.
- 5.6 Vacuum Gauge:** This is a digital gauge that shows the chamber vacuum level in measurements of Torr and m/Torr. The gauge Display is ON when the Main Power switch is activated. **Please note:** although this gauge has the capacity to act as a controller as described in the enclosed Terranova Vacuum Control manual, it has not been wired for these capabilities. In this application, it functions only as a gauge with a display.
- 5.7 Vacuum Valve:** This valve is located just below the control panel in a recessed box and marked VACUUM. It controls the vacuum of the chamber when opened counterclockwise and the pump is operating.
- 5.8 Vent Valve:** This valve is adjacent to the Vacuum valve and releases vacuum in the chamber, returning it to atmospheric pressure when the knob is turned counterclockwise. This valve must be closed (clockwise) when evacuating the chamber.
- 5.9 Fuses:** These protective devices are located on the oven's outside rear panel, next to the power input connections. They protect the oven against accidental overload of the vacuum pump outlet. This outlet is located in the vacuum pump area on the bottom of the control panel box. If the fuse(s) are blown, remove any plugs from the vacuum pump outlet, locate the fault and replace the fuse(s) with the same type and rating. Rating information is located on a label next to the fuses.

OPERATION

This unit is not supplied with a vacuum pump; however, plumbing and KF25 connections are provided, as well as mounting studs at the base of the cabinet. This unit requires a 220 volt pump to connect to the main power supply from the unit. If you have a pump that you intend to use for this application, all maintenance and instructional information should be obtained by the pump manufacturer and adhered to. In the Parts List located at the back of this manual, a pump assembly is listed as an available accessory. This assembly is listed as a convenience but does not imply that it is the required pump for the unit, as individual operating requirements may vary.

- 6.1 Power Supply:** The oven power requirements are listed on the data plate. THE POWER SUPPLY SHOULD NOT VARY MORE THAN $\pm 10\%$ from this rating. There is a convenience outlet located inside the cabinet at the top, which is rated 220v, 15amp. This outlet is for connecting the power cord of the pump to the unit, allowing the pump to be activated when the VACUUM switch is turned ON.
- 6.2** It is important to use vacuum tubing for all the vacuum hookups. Other types of tubing may collapse and prevent complete evacuation. All plumbing connections to the pump must be solid and tight to eliminate possible leakage.
- 6.3** When placing objects or samples within the chamber be mindful of the sensing probes mounted on the back wall. Any pressure against them can cause breakage and replacement will be necessary.
- 6.4** The door should be closed and latched by swinging the latching arm into place and turning the knob clockwise until it grabs and the door is snug against the body.
- 6.5 Power:** Turn the POWER switch to the ON position. This controls all power to the unit including the convenience outlet and VACUUM switch. Turn the High Limit Control to its maximum position - clockwise - in order that it not interrupt the setting of the Main Temperature controller and deactivate the power relay.

- 6.6 Reset button:** As noted in section 5.5, the RESET button must be pushed to reset the power relay in order that power be available to the unit.
- 6.7 Apply Vacuum to the Chamber:** Close the VENT valve by turning it fully clockwise (right.) Turn the VACUUM switch ON (I) and open the VACUUM valve by turning it fully counterclockwise (left). Watch the vacuum gauge display, and when the desired vacuum is achieved, close the VACUUM valve completely clockwise. Then turn the VACUUM switch OFF. Some applications may require that the vacuum pump stay on.

Note that ultimate vacuum levels may take some time. This is especially true if the contents in the chamber have oil or moisture in them.

- 6.8 Set Main Temperature Control:** To enter the desired set point temperature press either the Up or Down arrow pad until the desired temperature appears in the lower digital display window of the controller. *Note: the controller is configured in °C.* The upper digital window displays the process temperature (the temperature inside the oven.) Five to ten seconds after you change the temperature set point the controller will initiate the change. If heat is called for, the LED next to L1 will light. This is the main heater circuit. When this light is on, the oven is calling for heat. The Watlow 981 programmable controller is capable of storing and running up to 24 steps of ramp and soak temperature profiles. Refer to the *Watlow 982 User's Manual* for complete instructions on operating and programming this controller.

NOTE: Slight vapor or smoke may occur in the initial heat-up. This is a normal occurrence when the oven is first brought up to temperature and protective coatings on the elements become hot.

- 6.9 Setting High Limit Controller:** As stated in section 6.5, the High Limit should be set to its maximum position to allow the Main control to be set without interruption. Once the Main Temperature control is stable at the desired set point, the High Limit needs to be adjusted. To do this, turn the control knob counterclockwise until the oven trips off. Next, turn the knob clockwise one or two increments on the scale (the scale is in reference to the current setting only.) Push the RESET button to reactivate the power. Now the High Limit Control is set at approximately 10°C above the Main Control. If the Oven does not turn on, the High Limit is not set higher than the Main Temperature set point and needs to be adjusted clockwise another increment.

MAINTENANCE

NOTE: Prior to any maintenance or service on this unit, disconnect the service cord from the power supply.

- 7.1 Cleaning:** Cleaning the oven on a regular basis improves vacuum performance. To prepare the oven for cleaning, remove the shelves, shelf slides and door gasket. All of these components are autoclavable, or clean as described below. Be careful not to disturb the sensors located on the back wall; any undue pressure may cause breakage and replacement will be necessary. Disinfect with a solution that is suitable for your application. Any oily residue or moisture in the chamber should be removed after each operation to ensure maximum performance.

Using a lint free rag, wash the oven chamber and all parts with isopropyl or ethyl alcohol and dry thoroughly. DO NOT use chlorine based bleaches or abrasives as this may damage stainless steel surfaces. DO NOT use spray cleaners that might leak through openings and cracks and get on electrical parts or that may contain solvents that will harm the coatings.

When cleaning the gasket, handle it carefully so as not to impair the positive seal.

WARNING: Always disconnect the unit from the electrical service when cleaning and assure all volatile or flammable cleaners are evaporated and dry before reattaching the unit to the power supply.

- 7.2 Vacuum pump maintenance:** Refer to the operation manual supplied with your vacuum pump for detailed descriptions of recommended maintenance routines. Oil levels, replacement of sorbent charge, and exhaust filter are typical areas for attention. Contact your vacuum pump supplier if you do not have an operation manual.

PARTS LIST

Description	220V
Circuit Breaker, 20A	1100500
Controller	1750587
Element, Long (x2)	9570876
Element, Med (x4)	9570877
Element, Short (x2)	9570878
Gasket 12 x 12 (Viton)	3450560
Gasket 24.5 x 26 (Viton)	3450559
Glass	110107
High Limit Control	1750571
I/O Switch, green	103351
KF25 blank	3100595
KF25 centering ring	3100592
KF25 hinged clamp	3100595
KF40 blank	3100607
KF40 centering ring	3100609
KF40 hinged clamp	3100608
Pump assembly, option	9990614
Solid state relay	102162
Switch, Reset	101746
Vacuum gauge	8550501
Vacuum Gauge Tube	8550502

UNIT SPECIFICATIONS

	Shipping	Net
Weight	770 lbs.	492 lbs.

	Exterior WxDxH	Interior WxDxH
Dimensions	36 x 44 x 62"	28 x 24 x 24"

	Cubic Feet
Capacity	9.33

	Range	Uniformity	Rise Time
Temperature	Ambient + 10° to 200°C	±10°C @ 200°C	60 min. to 100°C

	Volts/Hz	Amps
Electrical	230v 50/60 hz	15A

WIRING DIAGRAM

